

AMENDMENTS TO THE CLAIMS

Claims 1 – 138 (Canceled)

139. (Currently amended) A method of operating a fluid control valve, said method comprising:

providing a valve comprising a flow path, a flexible member, and a normally closed actuator;
mechanically driving said flexible member with said normally closed actuator to shut said flow path;
with said normally closed actuator, mechanically holding said valve closed in an inactive state in which it cannot be operated pneumatically;
changing said valve to an active state in which it can be opened and closed pneumatically; and
opening and closing said valve pneumatically.

140. (Original) A method as in claim 139 wherein said changing comprises pneumatically actuating a mechanical valve actuator.

141. (Original) A method as in claim 139 wherein said mechanically holding comprises holding said valve closed with a spring.

142. (Original) A method of operating a fluid control valve comprising:
holding said valve diaphragm closed with a mechanical actuator;
releasing said mechanical actuator; and
opening and closing said valve diaphragm pneumatically.

143. (Original) A method as in claim 142 wherein said releasing is performed pneumatically.

144. (Previously presented) A method as in claim 142 wherein, coordinated with said releasing, pneumatic pressure is substituted for mechanical pressure to hold said valve closed.

Claims 145 – 152 (Canceled)

153. (Previously presented) A method of operating a fluid control valve, said method comprising:

providing a valve including a valve control chamber, a valve seat, a fluid flow path through said valve seat, a valve diaphragm, and a valve actuator;

holding said valve diaphragm closed with the force of said valve actuator in an inactive state; and

pneumatically reducing the force of said valve actuator against said valve diaphragm while changing the pressure in said valve chamber to hold said valve diaphragm closed to create an active shut valve state.

154. (Previously presented) A method as in claim 153 wherein said valve diaphragm is located between said valve control chamber and said valve seat, and said changing the pressure in said valve chamber comprises increasing the pressure in said valve chamber.

155. (Previously presented) A method as in claim 153 wherein said providing further comprises providing a piston connected to said valve actuator, and said pneumatically reducing comprises pneumatically forcing said piston connected away from said valve diaphragm.

156. (Previously presented) A method as in claim 155, and further comprising releasing said force on said piston to disable flow through said valve seat when said diaphragm fails.

157. (Previously presented) A method as in claim 153, and further comprising:
releasing the pressure in said valve control chamber to open said flow path through said valve seat to create an active open valve state.

158. (Previously presented) A method as in claim 157 wherein said providing further comprises providing a pilot valve, and said releasing comprises venting said valve control chamber through said pilot valve.

159. (Previously presented) A method as in claim 158 wherein said pilot valve is a three-way normally open valve, said providing further comprises providing a source of pressurized fluid, said changing the pressure in said valve chamber comprises connecting said valve chamber to said pressure source, and said releasing further comprises actuating said pilot valve to disconnect said valve chamber from said pressure source.

160. (Previously presented) A method as in claim 159, and further comprising de-actuating said pilot valve to connect said valve chamber to said source of pressurized fluid to disable said fluid flow through said valve seat.

161. (Previously presented) A method as in claim 160 wherein the response time for said disabling said fluid flow through said valve seat is one millisecond or less.

162. (Previously presented) A method as in claim 160 wherein the response time for said disabling said fluid flow through said valve seat is one-half millisecond or less.

163. (Previously presented) A method as in claim 153, and further comprising adjusting the conductance of fluid flow path through said valve seat, wherein said adjusting is performed externally of said fluid valve.

164. (Previously presented) A method as in claim 163 wherein said providing further comprises providing a restricted gap between said valve actuator and said valve diaphragm when said valve actuator is released, and said adjusting comprises adjusting the travel of said valve actuator, thereby controlling the size of said restricted gap.

165. (Previously presented) A method as in claim 153, and further comprising controlling the pulsed delivery of gas into an atomic layer deposition (ALD) apparatus using said fluid control valve.

166. (New) A method as in claim 139 wherein said flexible member closes the flow path when said valve is closed and said opening and closing said valve pneumatically is performed by deflecting said flexible member using gas pressure.

167. (New) A method as in claim 139 wherein said flexible member closes the flow path when said valve is closed.